AQUA DRILLING WATER SYSTEM (PWSNO 1280233)
SOURCE WATER ASSESSMENT REPORT

February 5, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Aqua Drilling Water System*, describes the public drinking water wells; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

A 270-foot deep well pumping from the Rathdrum Prairie Aquifer supplies drinking water for the four businesses that are connected to the Aqua Drilling Water System. The water system is located in a commercial area on Government Way between Hayden and Coeur d'Alene, Idaho. A ground water susceptibility analysis conducted by DEQ January 9, 2002 ranked the well moderately susceptible to all classes of regulated contaminants.

This assessment should be used as a basis for determining appropriate new drinking water protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Because 186 public water systems in Idaho draw water from the Rathdrum Prairie Aquifer, they should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. Partnerships with state and local agencies and private landowners in the well recharge zone should also be established for help in managing the well recharge zone outside of the direct jurisdiction of Aqua Drilling Water System.

Pictures in the Aqua Drilling public water system file show that the system has already taken significant steps toward protecting its water source. The system has a locked well house with a drained concrete floor. The building is insulated and heated and shows good interior maintenance. The well was drilled before a leased or deeded well lot was required, but the system might want to consider fencing the area around the well as an additional protective measure. Appropriate back flow prevention devices should be installed at all businesses served by the water system. The system may want to distribute industry specific best management practices brochures to businesses in its recharge zone detailing simple, cost effective ways to protect ground water.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact your regional Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR AQUA DRILLING WATER SYSTEM

Section 1. Introduction - Basis for Assessment

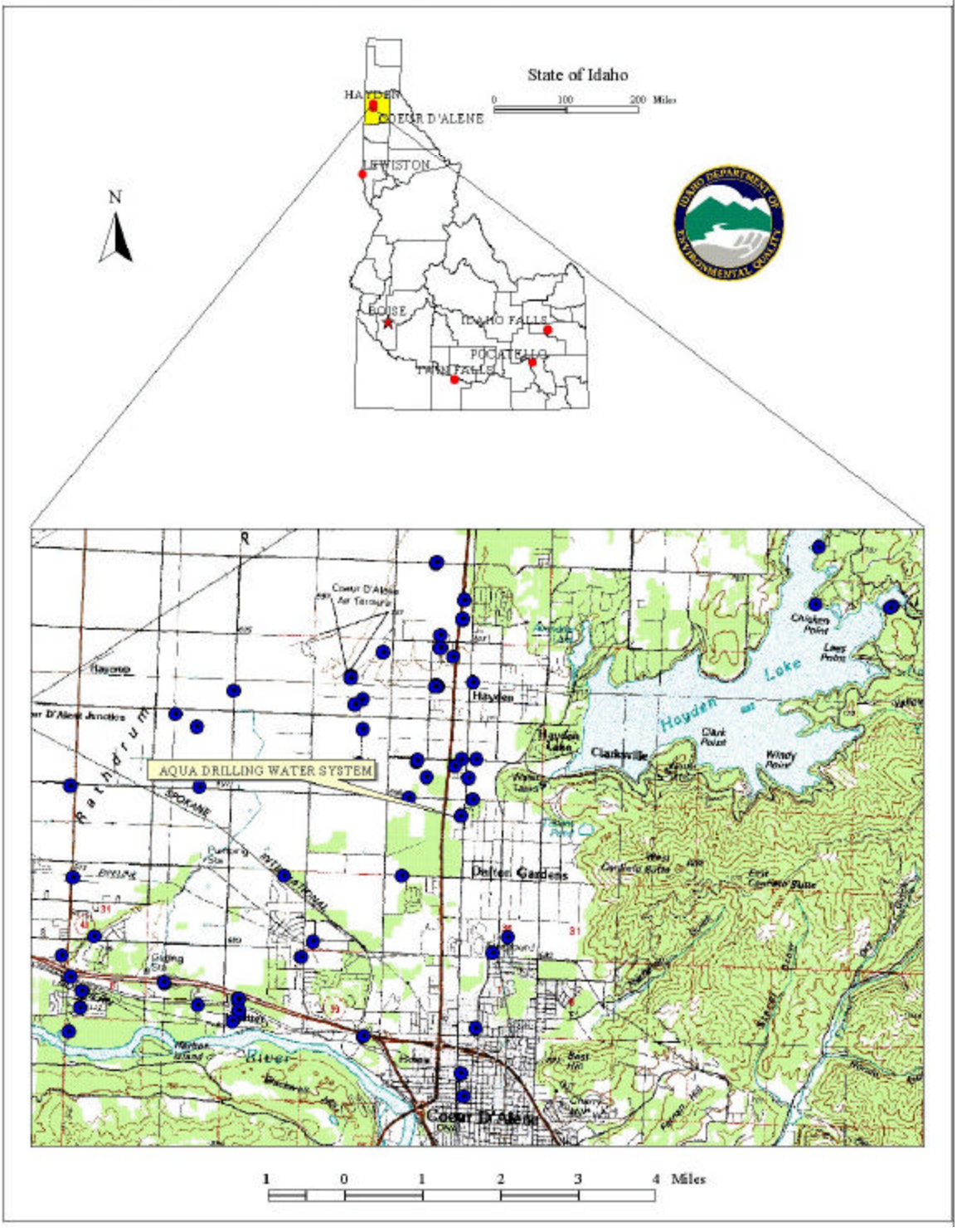
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Aqua Drilling Water System



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel (TOT) zones indicating the number of years necessary for a particle of water to reach a well. DEQ used a refined computer model approved by the EPA to determine the time of travel for water pumped from the Rathdrum Prairie Aquifer. The computer model used data DEQ assimilated from a variety of sources including local well logs.

Aqua Drilling Water System is under regulation as a non-community non-transient water system with 4 connections including a mini mart and deli on Government Way in Dalton Gardens (Figure 1). The recharge zone for the Aqua Drilling Water System well follows an "L" shaped path about 0.75 miles long (Figure 2). The delineation is divided into 0-3-year, 3-6-year and 6-10 year time of travel zones, encompassing a total of 18.3 acres.

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for Aqua Drilling Water System and all other public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources within a system's source water assessment area through the use of computer databases and Geographic Information System maps developed by DEQ. Maps showing the delineations and tables summarizing the results of the database search were then sent to system operators for review and correction during the second or enhanced phase of the inventory process.

Figure 2, *Aqua Drilling Water System Delineation and Potential Contaminant Inventory* on page 7 of this report shows the locations of the Aqua Drilling Water System well, the zones of contribution DEQ delineated for the well and approximate locations of potential contaminant sites in the vicinity.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

DEQ weighed the following factors to assess a well's susceptibility to contamination:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

Susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet, Attachment A, shows in detail how the Aqua Drilling Water System well scored.

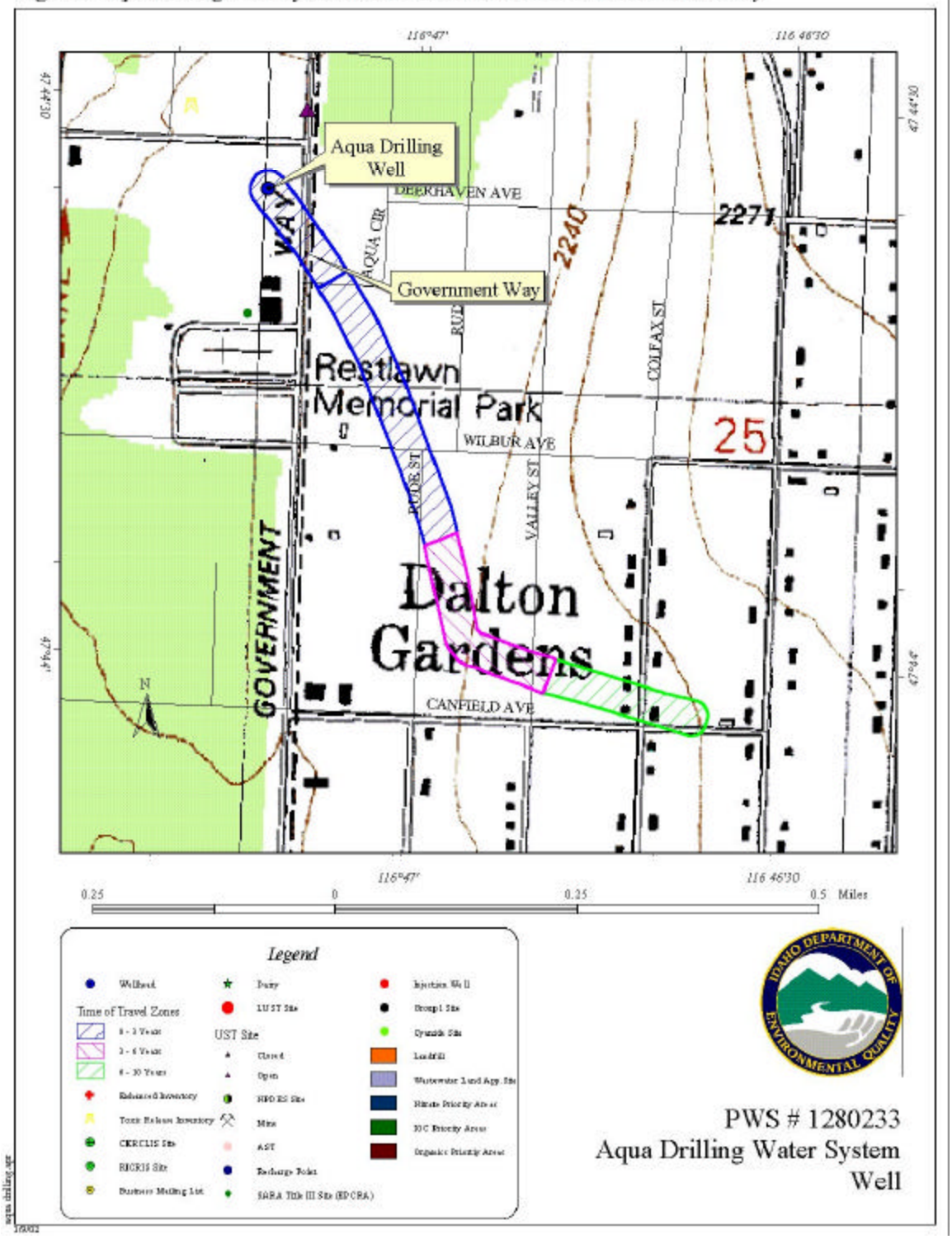
Well Construction

Well construction directly affects the ability of a well to protect the aquifer from contaminants. Lower scores imply a well that can better protect the ground water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent Sanitary Survey of the public water system. Rich Braun supplied the well driller's report for the Aqua Drilling Water System well. A sanitary survey conducted in February 2000 concluded that the system is mostly in compliance with *Idaho Rules for Public Drinking Water Systems.* No deficiencies in wellhead or surface seal maintenance were noted.

The well was drilled in 1971 to a depth of 270 feet. The static water level is 230 feet below the surface. The well has an 8-inch steel casing of unknown gauge that extends 5 inches above the pump house floor and is fitted with a vented sanitary well seal. Before the pumphouse was added, the well casing height was 12 inches above grade. The casing is unperforated and extends the full depth of the well, terminating in a water bearing gravel-sand stratum. The puddling clay surface seal is approximately 18 feet deep and terminates in a layer of sand and gravel.

Current Idaho Department of Water Resources standards require a minimum seal depth of 20 feet for public drinking water wells drilled in an unconsolidated formation like the Rathdrum Prairie Aquifer. The required wall thickness for 8-inch steel casing is 0.322 inches. The standards require the casing to project at least 12 inches above the pumphouse floor and at least 18 inches above the final ground surface.

Figure 2. Aqua Drilling Water System Delineation and Potential Contaminant Inventory.



Hydrologic Sensitivity

Hydrologic sensitivity scores reflect natural geologic conditions at the well site and in the recharge zone. Information for this part of the analysis is derived from individual well logs and from the soil drainage classification inside the delineation boundaries. The Aqua Drilling Water System well scored 6 points out of 6 points possible in the hydrologic sensitivity portion of the susceptibility analysis. Soils in the recharge zone generally are classed as moderately well to well drained. Soils that drain rapidly are deemed less protective of ground water than finer grained, slow draining soils. The well log describes four distinct soil layers above the water table at the Aqua Drilling well site:

1. Clay and gravel from 0 to 18 feet
2. Sand and gravel from 18 to 65 feet
3. Clay and gravel from 65 to 102 feet
4. Sand, gravel and boulders from 102 to 235 feet.

Water was first encountered in the sand, gravel and boulder layer extending from 235 to 263 feet below the surface. The clay-gravel layers above the water table are not considered an aquitard because the mixture of materials may provide avenues for the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

The recharge zone for the Aqua Drilling Water System is primarily urban. Land use out to the 3-year time of travel zone is mostly commercial. The 3-6 and 6-10 year time of travel zones lie under a residential area. Government Way is considered a major transportation corridor because of the volume of traffic it carries, and is a significant potential source of every class of regulated contaminant.

Figure 2, *Aqua Drilling Water System Delineation and Potential Contaminant Inventory* on page 7 shows the locations of the Aqua Drilling Water System well, the zones of contribution DEQ delineated for the well, and locations of potential contaminant sites in the vicinity. Because this area is developing rapidly, the inventory should be updated frequently.

Historic Water Quality

Historically, Aqua Drilling Water System has had few water quality problems. Quarterly tests for total coliform bacteria have been negative since the system came under regulation in 1988. Annual nitrate tests from 1993 to 2000 show concentrations ranging between 1.1 and 2.74 mg/l. The Maximum Contaminant Level (MCL) for nitrate is 10 mg/l. Results are not on file for 1996. Other inorganic chemicals present in the water are Barium (MCL=2.0 mg/l) at 0.03 mg/l; Sodium in concentrations between 3.71 and 5.18 mg/l; and Sulfate at concentrations between 14.8 and 16.3 mg/l. Where lead was present in distribution samples drawn in 1995, the average 90^{th} percentile concentration was 0.014mg/l. The action level for lead is 0.015 mg/l.

Synthetic organic compounds (SOCs) and volatile organic compounds (VOCs) have never been detected in the water, and the Aqua Drilling Water System has been granted waivers to reduce monitoring for those compounds.

Final Susceptibility Ranking

The Aqua Drilling Water System well ranked moderately susceptible to all classes of regulated contaminants. Hydrologic sensitivity factors associated with the geology of the well site added the most points to the final scores counted against the well. In the potential contaminant inventory portion of the analysis, urban land use throughout the recharge area and the presence of a busy transportation corridor crossing the 0-3 year time of travel zone are significant potential sources of ground water contamination. Cumulative scores for the well are summarized on Table 2. A complete susceptibility analysis worksheet for the well can be found in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 1. Summary of Aqua Drilling Water System Susceptibility Evaluation

Susceptibility Scores					
System Construction	Hydrologic Sensitivity	Contaminant Inventory			
		IOC	VOC	SOC	Microbial
4	6	5	5	5	4
Final Susceptibility Score/Ranking					
IOC		VOC		SOC	Microbial
11/Moderate		11/Moderate		11/Moderate	12/Moderate

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
HIGH* - Indicates source automatically scored as high susceptibility due to presence of bacteria or a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local n area. The state and local health districts have instituted enhanced protection of the ground water in the Rathdrum Prairie Aquifer because of its high use and uniquely pristine water quality. The protections are generally aquifer wide and are not aimed at zones of contribution to a specific well or water system.

The Spokane Valley-Rathdrum Prairie Atlas, sent to water systems on the prairie when they were invited to perform an enhanced contaminant inventory, describes some of the regional protection measures.

The 186 public water systems in Idaho that draw water from the Rathdrum Prairie Aquifer should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. These types of measures could be used to protect the capture zones of a specific system or group of wells that could be put at risk from local land use changes. Partnerships with state and local agencies and industry groups should also be established. For instance, source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, local Soil Conservation District, and the Natural Resources Conservation Service.

Pictures in the Aqua Drilling public water system file show that the system has already taken significant steps toward protecting its water source. The system has a locked well house with a drained concrete floor. The building is insulated and heated and shows good interior maintenance. The well was drilled before a leased or deeded well lot was required, but the system might want to consider fencing the area around the well as an additional protective measure. The fence would keep vehicles away from the well and would be a reminder to keep parking lot and landscaping maintenance chemicals away from this sensitive area. Appropriate back flow prevention devices should be installed at all businesses served by the water system. The system may want to distribute industry-specific best management practices (BMP) brochures to businesses in its recharge zone detailing simple, cost-effective ways to protect ground water. . While the primary goal is pollution prevention, utilizing BMPs can lower operating costs, reduce exposure to future liability and improve a company's public image.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies. The goal of ground water protection is to maintain high water quality despite population growth and increasing demand on this essential resource.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.dea.state.id.us

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 343-7001 for assistance with wellhead protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality, 2000. City of Fruitland Wellhead Viability Project 319 Grant Final Report July 2000.

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Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Aqua Drilling Water System Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **AQUA DRILLING WATER SYSTEM** Source: **WELL #1**

Public Water System Number : **1280233** 1/9/02 1:19:04 PM

1. System Construction			SCORE			
Drill Date	1971					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	1999				
Well meets IDWR construction standards	NO		1			
Wellhead and surface seal maintained	YES		0			
Casing and annular seal extend to low permeability unit	NO		2			
Highest production 100 feet below static water level	NO		1			
Well located outside the 100 year flood plain	YES		0			
Total System Construction Score			**4**			
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	NO		2			
Vadose zone composed of gravel, fractured rock or unknown	GRAVEL		1			
Depth to first water > 300 feet	NO		1			
Aquitard present with > 50 feet cumulative thickness	NO		2			
Total Hydrologic Score			**6**			
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL		2	2	2	2
Farm chemical use high	NO		0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO		NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A			**2**	**2**	**2**	**2**
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)						
Contaminant sources present (Number of Sources)	YES		1	1	1	1
(Score = # Sources X 2) 8 Points Maximum			2	2	2	2
Sources of Class II or III leacheable contaminants or Microbials	YES		1	1	1	
4 Points Maximum			1	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO		0	0	0	0
Land use Zone 1B			0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B			**3**	**3**	**3**	**2**
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)						
Contaminant Sources Present	NO		0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO		0	0	0	
Land Use Zone II	Less than 25% Agricultural Land		0	0	0	
Potential Contaminant Source / Land Use Score - Zone II			**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)						
Contaminant Source Present	NO		0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO		0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO		0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III			**0**	**0**	**0**	**0**
Cumulative Potential Contaminant / Land Use Score			**5**	**5**	**5**	**4**
4. Final Susceptibility Source Score			**11**	**11**	**11**	**12**
5. Final Well Ranking			Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.